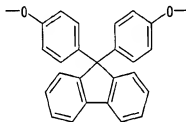


CLAIMS

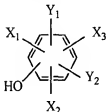
What is claimed is:

1. An electrophotographic photoreceptor comprising:
a conductive substrate; and
a photoreceptor layer formed on the substrate, wherein the photoreceptor layer comprises polyester resins as binder resin having biphenyl fluorene units of the following chemical Formula (1) in the main chain, and phenolic compounds as antioxidant having the following chemical Formula (2):

Formula (1)

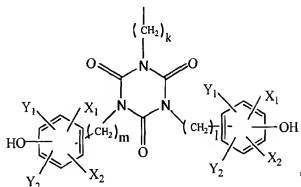
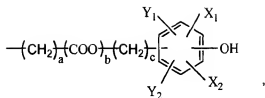


Formula (2)

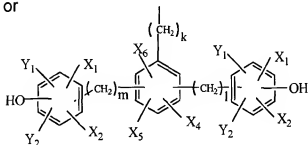


where, in Formula (1), the hydrogens in the aromatic rings are optionally substituted with substituents selected from the group consisting of halogen, C₁-C₂₀ aliphatic hydrocarbon, and C₅-C₈ cycloalkyl,

where, in Formula (2), X₁ and X₂ are independently selected from the group consisting of hydrogen and C₁-C₆ alkyl; Y₁ and Y₂ are independently selected from the group consisting of hydrogen, methyl and ethyl; and X₃ is C₁-C₆ alkyl, and



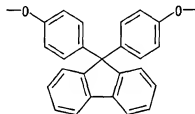
or



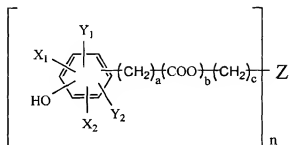
where a, c, k, l, and m, independently, are integers between 0 and 6, b is 0 or 1, X₁, X₂, Y₁ and Y₂ have the same meaning as above; and X₄, X₅, and X₆ are independently selected from the group consisting of hydrogen and C₁-C₈ alkyl.

2. An electrophotographic photoreceptor comprising:
 a conductive substrate; and
 a photoreceptor layer formed on said substrate, wherein the photoreceptor layer comprises polyester resins as binder resin having biphenyl fluorene units of the following chemical Formula (1) in the main chain, and phenolic compounds as antioxidants having the following chemical Formula (3):

Formula (1)



Formula (3)

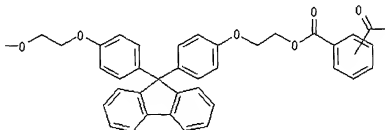


where, in Formula (1), the hydrogens in the aromatic rings are optionally substituted with substituents selected from the group consisting of halogen, C₁-C₂₀ aliphatic hydrocarbon, and C₅-C₈ cycloalkyl; and

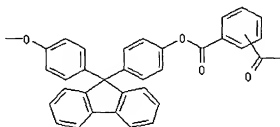
where, in Formula (3), X_1 and X_2 are independently selected from the group consisting of hydrogen and C_1 - C_6 alkyl; Y_1 and Y_2 are independently selected from the group consisting of hydrogen, methyl, and ethyl; a and c are integers between 0 and 6; b is 0 or 1; n is an integer between 2 and 4; Z is S or O when n is 2, N when n is 3, and C when n is 4.

3. The electrophotographic photoreceptor according to claim 1, wherein the polyester resin is a polyester resin having repeating units of the following chemical Formula (4), (5) or (6), or a copolymer comprising more than two of the repeating units:

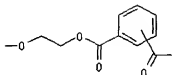
Formula (4)



Formula (5)

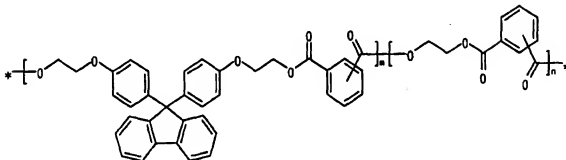


Formula (6)



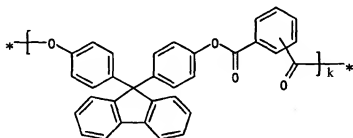
4. The electrophotographic photoreceptor according to claim 1, wherein said polyester resin is a compound of the following general Formula (7) or (8):

Formula (7)



where m and n, independently, are each an integer between 10 and 1,000,

Formula (8)

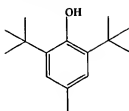


where k is an integer between 10 and 1,000.

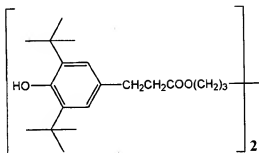
5. The electrophotographic photoreceptor according to claim 1, wherein the content of the antioxidant is from 0.01 wt% to 50 wt% based on the total weight of the charge transporting material of said photoreceptor layer.

6. The electrophotographic photoreceptor according to claim 1, wherein the antioxidant of the chemical Formula (1) is a compound selected from the group consisting of compounds of general Formula (9), (10), (11) and (12):

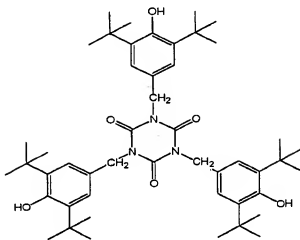
Formula (9)



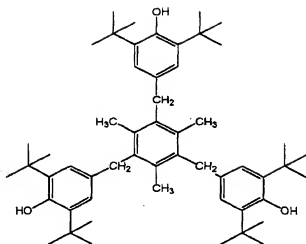
Formula (10)



Formula (11)

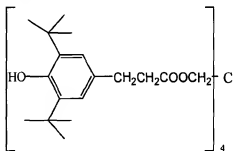


Formula (12)

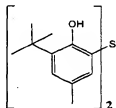


7. The electrophotographic photoreceptor according to claim 2, wherein the antioxidant of the chemical Formula (3) is a compound represented by the chemical Formula (13) or (14).

Formula (13)



Formula (14)

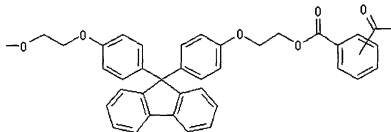


8. The electrophotographic photoreceptor according to claim 1, wherein said electrophotographic photoreceptor is an electrophotographic photoreceptor for a wet developing method.

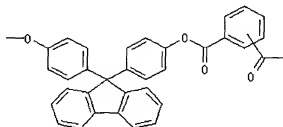
9. An electrophotographic device having the electrophotographic photoreceptor according to claim 1.

10. The electrophotographic photoreceptor according to claim 2, wherein the polyester resin is a polyester resin having repeating units of the following chemical Formula (4), (5) or (6), or a copolymer comprising more than two of the repeating units:

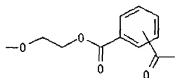
Formula (4)



Formula (5)

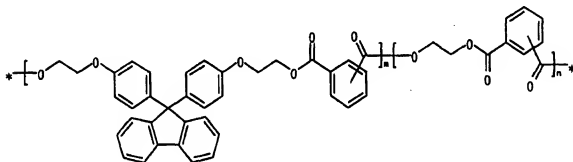


Formula (6)



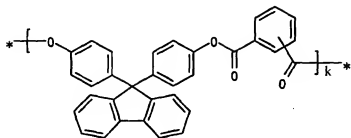
11. The electrophotographic photoreceptor according to claim 2, wherein said polyester resin is a compound of the following general Formula (7) or (8):

Formula (7)



where m and n, independently, are each an integer between 10 and 1,000,

Formula (8)



where k is an integer between 10 and 1,000.

12. The electrophotographic photoreceptor according to claim 2, wherein the content of the antioxidant is from 0.01 wt% to 50 wt% based on the total weight of the charge transporting material of said photoreceptor layer.

13. The electrophotographic photoreceptor according to claim 2, wherein said electrophotographic photoreceptor is an electrophotographic photoreceptor for a wet developing method.

14. An electrophotographic device having the electrophotographic photoreceptor according to claim 2.

15. An electrophotographic drum, comprising:

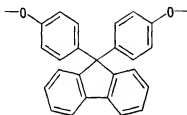
a drum; and

an electrophotographic photoreceptor disposed thereon, the electrophotographic photoreceptor comprising:

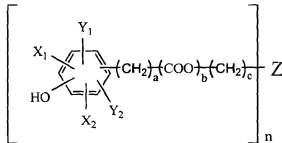
a conductive substrate; and

a photoreceptor layer formed on the substrate, wherein the photoreceptor layer comprises polyester resins as binder resin having biphenyl fluorene units of the following chemical Formula (1) in the main chain, and phenolic compounds as antioxidants having the following chemical Formula (3):

Formula (1)



Formula (3)



where, in Formula (1), the hydrogens in the aromatic rings are optionally substituted with substituents selected from the group consisting of halogen, C₁-C₂₀ aliphatic hydrocarbon, and C₅-C₈ cycloalkyl; and

where, in Formula (3), X₁ and X₂ are independently selected from the group consisting of hydrogen and C₁-C₆ alkyl; Y₁ and Y₂ are independently selected from the group consisting of hydrogen, methyl, and ethyl; a and c are integers between 0 and 6; b is 0 or 1; n is an integer between 2 and 4; Z is S or O when n is 2, N when n is 3, and C when n is 4,

wherein the electrophotographic drum is attachable to/detachable from an image forming apparatus.

16. An electrophotographic drum, comprising:

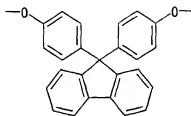
a drum; and

an electrophotographic photoreceptor disposed thereon, the electrophotographic photoreceptor comprising:

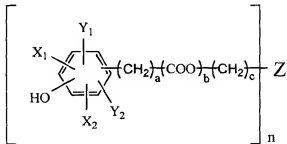
a conductive substrate; and

a photoreceptor layer formed on the substrate, wherein the photoreceptor layer comprises polyester resins as binder resin having biphenyl fluorene units of the following chemical Formula (1) in the main chain, and phenolic compounds as antioxidants having the following chemical Formula (3):

Formula (1)



Formula (3)



where, in Formula (1), the hydrogens in the aromatic rings are optionally substituted with substituents selected from the group consisting of halogen, C₁-C₂₀ aliphatic hydrocarbon, and C₅-C₈ cycloalkyl; and

where, in Formula (3), X₁ and X₂ are independently selected from the group consisting of hydrogen and C₁-C₆ alkyl; Y₁ and Y₂ are independently selected from the group consisting of hydrogen, methyl, and ethyl; a and c are integers between 0 and 6; b is 0 or 1; n is an integer between 2 and 4; Z is S or O when n is 2, N when n is 3, and C when n is 4,

wherein the electrophotographic drum is attachable to/detachable from an image forming apparatus.

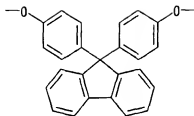
17. An electrophotographic cartridge, comprising:

an electrophotographic photoreceptor comprising:

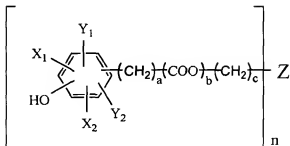
a conductive substrate; and

a photoreceptor layer formed on the substrate, wherein the photoreceptor layer comprises polyester resins as binder resin having biphenyl fluorene units of the following chemical Formula (1) in the main chain, and phenolic compounds as antioxidants having the following chemical Formula (3):

Formula (1)



Formula (3)



where, in Formula (1), the hydrogens in the aromatic rings are optionally substituted with substituents selected from the group consisting of halogen, C₁-C₂₀ aliphatic hydrocarbon, and C₅-C₈ cycloalkyl; and

where, in Formula (3), X₁ and X₂ are independently selected from the group consisting of hydrogen and C₁-C₆ alkyl; Y₁ and Y₂ are independently selected from the group consisting of hydrogen, methyl, and ethyl; a and c are integers between 0 and 6; b is 0 or 1; n is an integer between 2 and 4; Z is S or O when n is 2, N when n is 3, and C when n is 4; and

at least one of:

a charging device that charges the electrophotographic photoreceptor;

a developing unit which develops an electrostatic latent image formed on the electrophotographic photoreceptor; and

a cleaning device which cleans a surface of the electrophotographic photoreceptor,

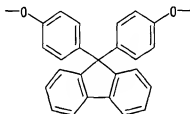
wherein the electrophotographic cartridge is attachable to/detachable from an image forming apparatus.

18. An electrophotographic cartridge, comprising:
an electrophotographic photoreceptor comprising:

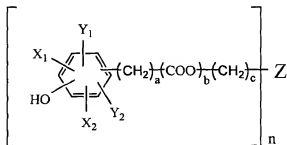
a conductive substrate; and

a photoreceptor layer formed on the substrate, wherein the photoreceptor layer comprises polyester resins as binder resin having biphenyl fluorene units of the following chemical Formula (1) in the main chain, and phenolic compounds as antioxidants having the following chemical Formula (3):

Formula (1)



Formula (3)



where, in Formula (1), the hydrogens in the aromatic rings are optionally substituted with substituents selected from the group consisting of halogen, C₁-C₂₀ aliphatic hydrocarbon, and C₅-C₈ cycloalkyl; and

where, in Formula (3), X₁ and X₂ are independently selected from the group consisting of hydrogen and C₁-C₆ alkyl; Y₁ and Y₂ are independently selected from the group consisting of hydrogen, methyl, and ethyl; a and c are integers between 0 and 6; b is 0 or 1; n is an integer between 2 and 4; Z is S or O when n is 2, N when n is 3, and C when n is 4; and at least one of:

a charging device that charges the electrophotographic photoreceptor;

a developing unit which develops an electrostatic latent image formed on the electrophotographic photoreceptor; and

a cleaning device which cleans a surface of the electrophotographic photoreceptor,

wherein the electrophotographic cartridge is attachable to/detachable from an image forming apparatus.

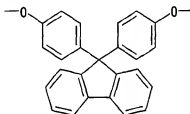
19. An image forming apparatus, comprising:

a photoconductor unit having an electrophotographic photoreceptor, the electrophotographic photoconductor comprising:

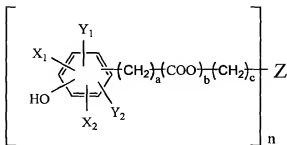
a conductive substrate; and

a photoreceptor layer formed on the substrate, wherein the photoreceptor layer comprises polyester resins as binder resin having biphenyl fluorene units of the following chemical Formula (1) in the main chain, and phenolic compounds as antioxidants having the following chemical Formula (3):

Formula (1)



Formula (3)



where, in Formula (1), the hydrogens in the aromatic rings are optionally substituted with substituents selected from the group consisting of halogen, C₁-C₂₀ aliphatic hydrocarbon, and C₅-C₈ cycloalkyl; and

where, in Formula (3), X₁ and X₂ are independently selected from the group consisting of hydrogen and C₁-C₆ alkyl; Y₁ and Y₂ are independently selected from the group consisting of hydrogen, methyl, and ethyl; a and c are integers between 0 and 6; b is 0 or 1; n is an integer between 2 and 4; Z is S or O when n is 2, N when n is 3, and C when n is 4;

a charging device which charges the photoconductor unit;

an imagewise light irradiating device which irradiates the charged photoconductor unit with imagewise light to form an electrostatic latent image on the photoconductor unit;

a developing unit that develops the electrostatic latent image with a toner to form a toner image on the photoconductor unit; and
 a transfer device which transfers the toner image onto a receiving material,

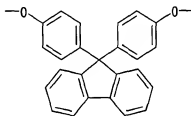
20. An image forming apparatus, comprising:

a photoconductor unit having an electrophotographic photoreceptor, the electrophotographic photoconductor comprising:

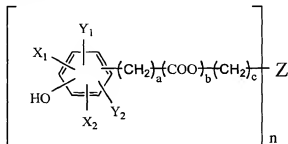
a conductive substrate; and

a photoreceptor layer formed on the substrate, wherein the photoreceptor layer comprises polyester resins as binder resin having biphenyl fluorene units of the following chemical Formula (1) in the main chain, and phenolic compounds as antioxidants having the following chemical Formula (3):

Formula (1)



Formula (3)



where, in Formula (1), the hydrogens in the aromatic rings are optionally substituted with substituents selected from the group consisting of halogen, C₁-C₂₀ aliphatic hydrocarbon, and C₅-C₈ cycloalkyl; and

where, in Formula (3), X₁ and X₂ are independently selected from the group consisting of hydrogen and C₁-C₆ alkyl; Y₁ and Y₂ are independently selected from the group consisting of hydrogen, methyl, and ethyl; a and c are integers between 0 and 6; b is 0 or 1; n is an integer between 2 and 4; Z is S or O when n is 2, N when n is 3, and C when n is 4;

a charging device which charges the photoconductor unit;

an imagewise light irradiating device which irradiates the charged photoconductor unit with imagewise light to form an electrostatic latent image on the photoconductor unit;

a developing unit that develops the electrostatic latent image with a toner to form a toner image on the photoconductor unit; and

a transfer device which transfers the toner image onto a receiving material,